

MARINE REVIEW.

VOL. X.

CLEVELAND, O., AUGUST 16, 1894.

No. 7.

Lake Freight Matters.

In the absence of any demand for the vessels to move grain, with only moderate shipments of hard coal out of Buffalo, the great bulk of the best of coarse freight tonnage on the lakes is still forced to engage steadily in the ore and soft coal trades, and the great wonder is that even in these lines freights have been held at the figures of the past several weeks. Shipments of soft coal are certainly enormous, and the movement to Lake Superior during August will undoubtedly exceed that of any other month in the history of the business. Shippers are undoubtedly taxing the best efforts of the railways operating between the mines and Lake Erie ports, in order to forward the bulk of their coal during the present month and avoid an advance or take advantage of still lower freights on all that they may have to go later. On account of the light movement of down bound freight from Lake Michigan, the Milwaukee rate on soft coal has been advanced to 55 cents, and there is little tonnage to be had even at this figure, but the steady and abundant supply of boats for the head of Lake Superior still prevents an advance in the 40 cent rate. The demand for wild boats in the ore trade has been fairly active and rates are steady and unchanged at 60 cents from the head of the lakes, 55 cents from Marquette and 40 cents from Escanaba.

Five New Government Vessels.

A careful examination of the sundry civil appropriation bill shows that appropriations for five government vessels—two tugs, one light-ship and two revenue cutters—are now available. There is not great desire on the part of lake builders to engage in government work, but as any of these vessels may be built on the lakes, the list with the names of departments or bureaus in charge of plans and specifications is printed below:

Boston harbor light-ship, appropriation of \$35,000 and vessel not to cost more than \$70,000; plans and specifications from light-house board.

For purchase or construction of two steam tugs for service in New York harbor, \$90,000; plans and specifications, if new boats are constructed, from Gen. Casey, chief of engineers, U. S. A.

Revenue cutter for New England coast, appropriation of \$75,000, and vessel not to cost more than \$175,000; plans and specifications from chief of revenue marine service, treasury department.

Revenue cutter for great lakes, appropriation of \$75,000, and vessel not to cost more than \$175,000; plans and specifications from chief of revenue marine service, treasury department.

A third revenue cutter, to be located on the Pacific coast, and to cost \$175,000 also, is provided for in a separate bill passed a few days ago, but there is some question as to whether the money for this boat will be available immediately.

No Light for Cape Hatteras.

Although preparations were made a short time ago to resume the attempt to build a light-house on the famous Outer Diamond shoal, Cape Hatteras, N. C., the plans must again be dropped, at least for another year. In 1889 congress appropriated \$200,000 for this light, with a proviso that the contract for its construction might be let for the entire structure at a total cost not exceeding \$500,000. The failure of contractors on the work is well known. Recently the light-house service caused soundings to be made on the shoal, and in the present congress an effort was made to again secure the appropriation referred to with the understanding that the construction of the light be effected by contract or otherwise at the discretion of the secretary of the treasury. This latter proviso was intended to permit of the light-house board undertaking the construction of the light on its own account, if such a course was thought advisable, but the whole matter has been brought to a standstill by an amendment to the appropriation bill, covering such matters, being killed a few days ago in conference.

Not a Fault in the Channel.

Of course any accidents to vessels in the Hay lake channel at this time may, without a knowledge of the facts, tend to cause doubt among vessel masters and owners regarding the value of the new waterway. An effort has been made, accordingly, to secure particulars regarding the stranding of the Pillsbury, and a trusted correspondent sends us the following:

"It appears that the Pillsbury attempted to take the Hay lake route without a pilot, and when she reached the turn at the upper end, there were a number of small buoys in the channel, put down to mark certain

places where the 20-foot grade had not been reached by the dredge contractors. Although there was plenty of water over the spot for anything that could go through the canal, the captain of the boat, seeing these buoys, or 'markers,' as they are called, supposed they indicated places over which he could not pass, became alarmed and backed his boat. This, together with the fact of his not being familiar with the entrance to the channel, caused the boat to run too far down before turning to the entrance, resulting in her going on the shoals below and outside of the Hay lake channel bank. There was plenty of water and room to make the turn, but it is necessary for a large boat to begin doing so before getting in line with the dredge cut."

Barred Out the Only New Light.

About the only amendment of importance made in that part of the appropriation bill covering aids to navigation, was a clause which Senator McMillan had caused to be inserted, providing for a light on North Manitou island, Lake Michigan, at a point to be designated by the light-house board, and at a cost of \$20,000. In another part of this issue of the REVIEW this item is reported as having been carried with the bill, but such is not the case. It was one of a few items cut out at the last moment in conference and probably upon recommendation of executive officers of the light-house board, who seem to never miss an opportunity to make reports against new aids to navigation on the lakes. Although a long list of new lights and fog signals on the lakes have been authorized, the appropriations for them are not forthcoming, simply for the reason that the officers of this board refuse to recognize the importance of commerce here, and vessel owners are not aggressive in their dealings with the service

Work With One, Two and Three Screws.

The official report of the trial of the Minneapolis, which has just been published contains some very interesting information on the trials made with one, two, and with three screws subsequently to the official speed trial. These trials were each of eight hours' duration, and were made for the purpose of getting some reliable data as to the relative efficiency when running with one, two and three screws at a speed of 12 knots, and to give the department some idea of the most economical way of running the ship when cruising. An extract from the report printed in the Army and Navy Journal, is as follows:

"The short duration of the trials can not be accepted as giving absolutely accurate results, but the data is of more than ordinary value, especially as such trials were not made with the Columbia. Owing to foggy weather, the ship had to run slower than was intended, the speed being something under ten knots. With one screw she made 9.73 knots per hour on 1,928 horse power for all purposes, and burned 4,630 pounds of coal per hour. With two screws, the speed was practically the same, 9.71 knots, but the horse power was nearly 100 more, being 2,017, and the coal per hour 4,773 pounds. In the first case the revolutions of the main engines were seventy-four with the center engines, and in the latter case sixty-four and sixty-three with the starboard and port screws respectively.

"The third trial, with the three screws in operation, was made at a speed of 11.6 knots, or a trifle more than half the speed made on the speed trial. The revolutions of the engines were sixty-five for the center one and sixty-six for the other two. The horse power was 2,491, and the coal burned 6,481 pounds per hour, thus indicating pretty conclusively that for such a low rate of speed three screws are decidedly uneconomical, which was clearly pointed out in the reports of Engineer-in-Chief Melville when the designs were made, it being then proposed to run with one and two screws for low power and to use three screws only for the maximum speed. A comparison of the trials with one and two screws shows that while the power and the coal burned are almost identical, so is also the speed in the two cases. The drag of the two idle screws when running with only one screw in operation was enough to make the revolutions of the center screw ten more than that of the other two when running at practically the same speed; and the effect of the drag of even one screw is shown in the trial with three screws, where with only two more revolutions than when running with two screws, the speed is nearly two knots more. Another interesting point which this trial shows, is that while it took something more than 2,500 horse power to drive the Minneapolis 11.6 knots, it took more than eight times this power to give her the trial speed of 23.07 knots, and indicates why it is more economical to drive our ships at low speed than at high, a point with which our technical officers are quite familiar, but which is not so well known to the layman."

Appropriations for Lights, Surveys, Etc.

Following is a list of appropriations for the lakes that will, in addition to the river and harbor appropriations, be available within a few days, as a result of the passage of the sundry civil appropriation bill:

Grassy Point range lights.—For moving range lights, Maumee river, Ohio, \$2,000.

North Manitou island light station, Michigan.—For establishing a light at a point on the island to be designated by the light-house board, \$20,000.

Grassy island range lights, Michigan.—For completing the range lights above Grassy island, Detroit river, Michigan, \$1,500.

Seul Choix point light and fog signal, Mich.—For beginning a fog signal \$2,200; for completing structures at same point, the appropriation by the act of August 5, 1892, for moving St. Mary's river upper range lights, \$5,000, is made available.

Sandusky bay range light station, Ohio.—For moving and rebuilding range lights and building keeper's dwelling, \$25,000.

South Bass light station, Ohio.—For establishing a light station on or near this island, Lake Erie, \$8,000.

For lighting Hay lake channel, St. Mary's river, \$43,550; and the light-house board is hereby authorized to lease the necessary land for the sites of needed lights herein provided for, and for the sites of the lights in St. Mary's river, provided for by the act of March 3, 1891, pending the acquisition of the titles in accordance with sections 335 and 4,661, United States revised statutes, or where such lights are for temporary use or are used to point out changeable channels.

For establishing a steam fog signal at or near Pere Marquette light station, Ludington, Mich., \$5,500

For establishing a light and fog signal at or near Big Bay point, Lake Superior, \$25,000.

For establishing a light and steam fog signal in the vicinity of Hammond's bay, about halfway between Cheboygan and Presqu'ile lights, Lake Huron, \$25,000.

For the establishment of a light and steam fog signal at Round island, Lake Huron, \$15,000.

To enable full payment to be made of the amount of the award, taxed costs, and clerk's fees in the matter of obtaining title by proceedings in condemnation to Devil's island, Apostle group, Lake Superior, required as a site for said light station, \$283.94.

For constructing a revenue steamer of the first class, under the direction of the secretary of the treasury, for service on the great lakes, \$75,000; and the secretary of the treasury is authorized to contract for building said vessel, in terms not to exceed \$175,000, in accordance with the provisions of an act approved Nov. 3. 1893.

For continuing improvement of St. Mary's river, Michigan, at the falls, \$300,000.

For continuing improvement of Hay lake channel, St. Mary's river, \$150,000.

Survey of northern and northwestern lakes.—For printing and issuing charts for use of navigators and electrotyping plates for chart printing, \$2,000; for surveys, additions to, and correcting engraved plates, to be available until expended, \$25,000.

The Toronto Convention.

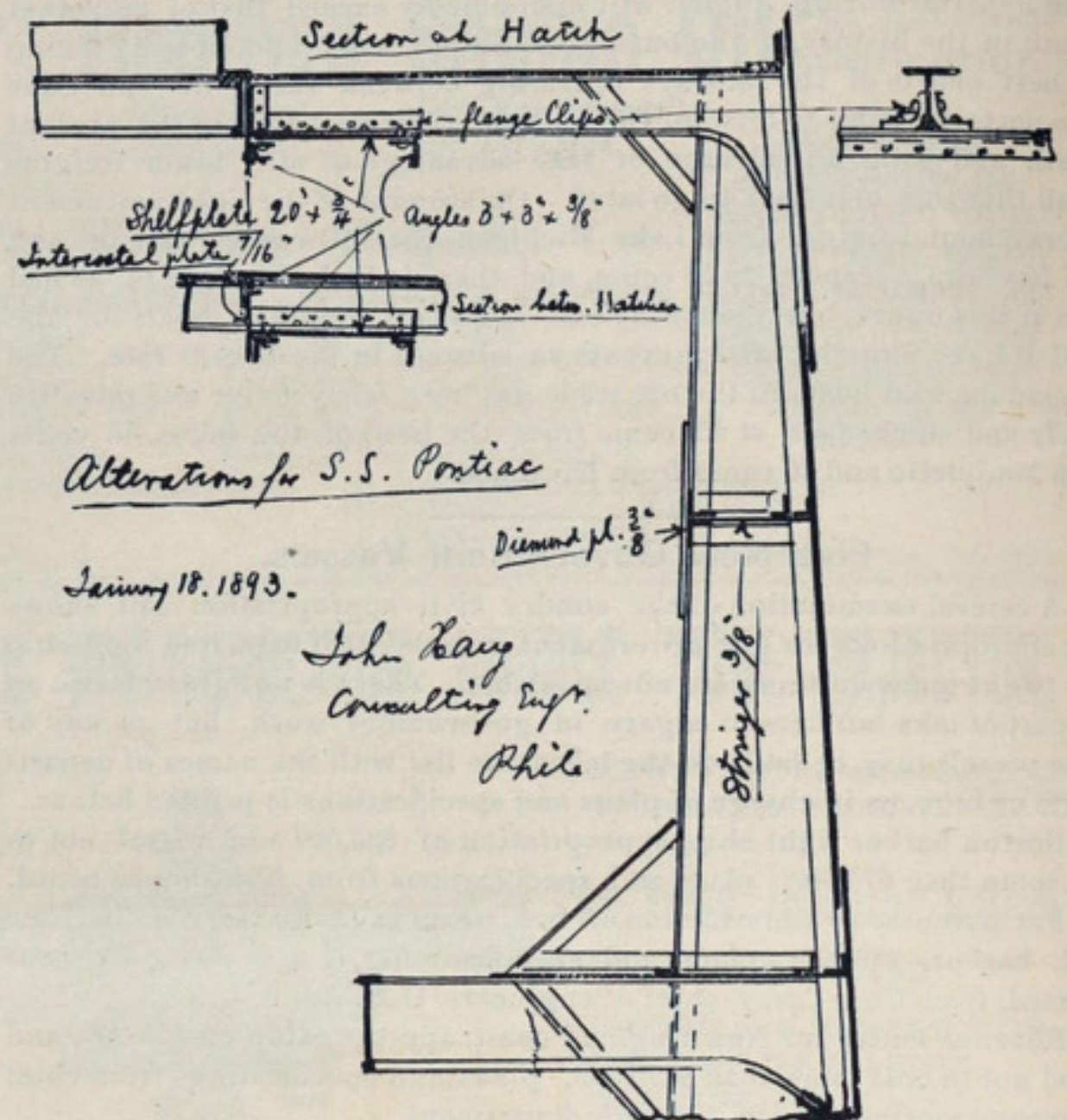
Sept. 17 is the date fixed for the opening of the Toronto convention of representatives of commercial bodies in the United States as well as the dominion, at which it is proposed to consider the question of urging the deepening at once of the Canadian canals between the lakes and the seaboard to 20 feet and to discuss the best means to be adopted for bringing about this result. The city council has made a grant of money for defraying expenses connected with the gathering and has appointed a committee to act with the citizens in the matter. The city halls have been reserved for the convention, and the secretary of the citizens committee, Mr. Peter McIntyre, is engaged in sending out 10,000 invitations to municipalities, boards of trade and individuals who will probably attend the meeting. The matter of a change to 20-foot depth in the Canadian canal programme has recently been discussed in the dominion parliament, where the Toronto members were found to be in favor of it.

Alderman J. Enoch Thompson, is chairman of the city council committee and is among those who will present papers to the convention. He has favored the REVIEW with an invitation to the convention, and says that invitations will be sent to state authorities, municipalities, mercantile, milling, shipping, and kindred associations from Halifax to St. Paul and from Rochester, N. Y., to Regina, N. W. T. The invitations that are being sent out emphasize the statement that the canal question is not of a local or sectional nature; the people of the western states of this country and the Canadian provinces are equally interested.

Although the make of coke pig iron has increased largely of late, the Iron Age reports stocks on August 1 aggregating only 223,902 tons, against 231,430 tons on July 1 and 302,427 tons on June 1.

Patents on Various Forms of Construction.

Some time ago Mr. E. Platt Stratton, surveyor for the American Shipmasters' Association of New York, one of the societies engaged in the classification of vessels for insurance purposes, suggested certain changes in the plans of two steel steamers constructed at the yard of F. W. Wheeler & Co., West Bay City, Mich., and which were to be classed in the register of the New York society. Later on Mr. Stratton applied for and secured a patent covering these suggestions, which had reference to detail of construction for strengthening upper works of the vessels. Now comes Mr. John Haug, naval architect of Philadelphia, who submits in a communication to the American Shipbuilder of New York, the accompanying copy of a plan, which he prepared for the steamers Pontiac and Frontenac of the Cleveland-Cliffs Iron Company's fleet, and which he says is nearly the same as that patented by Mr. Stratton but more efficient in resisting the twisting and racking strains in the upper works of vessels.



Mr. W. G. Mather of Cleveland, president of the Cleveland-Cliffs company says that among a number of suggestions made by Mr. Haug, who was consulted about the time the Pontiac and Frontenac were contracted for with the Cleveland Ship Building company, the plan here referred to was adopted. Thus Mr. Haug claims priority in the matter, as the Cleveland-Cliffs company's boats were built long before the Bay City-built steamers were thought off. In looking over diagrams indicating both plans, a naval architect now on the lakes, but who has had considerable experience among ship builders of Great Britain, remarked a few days ago that if people in the business on this side continue applying for patents on forms of construction that appear new to them, on account of being dropped through varying conditions, but which are really as old as the iron ship itself, there will be nothing left for the ship builder to do if he is to meet and fight out at law all demands for royalty.

Contracts for Two Side-Wheel Steamers.

The Bertram Engine Works Company of Toronto, of which Mr. A. Angstrom, formerly with the Cleveland Ship Building Company, is general manager, and with whom Robert Curr of Cleveland was also engaged recently, has secured a contract for two side-wheel steamers. The boats are for the Ottawa Improvement Company. The hulls, which are to be of steel with wood covering up to the water line, will be built at the yard of the Bertram works, Toronto, and then taken down to Pembroke for completion of cabins, etc. The larger of the two boats will be 140 feet long, 43 feet over guards, 8 feet 4 inches deep and 3 feet 3 inches mean draft. The engines for this boat will be compound, horizontal, 22 and 42 inches by 48 inches stroke, and she will have two boilers of locomotive type, 19 feet long and 4 feet 10 inches diameter. For the second boat, which will be 120 feet long, 38 feet 4 inches over guards, 5 feet 4 inches deep and 2 feet draft, engines and boilers as well as houses will be taken from another vessel.

AN EXTRA COPY OF THE PHOTO-GRVURE SUPPLEMENT OF DIRECTORS OF THE LAKE CARRIERS' ASSOCIATION, TOGETHER WITH THE LARGE ENGRAVING OF THE STEAMER NORTH WEST, BOTH OF WHICH WERE CONTAINED IN OUR BIG ISSUE, WILL BE MAILED IN A PASTEBOARD TUBE TO ANY ADDRESS UPON RECEIPT OF 50 CENTS IN STAMPS.

Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

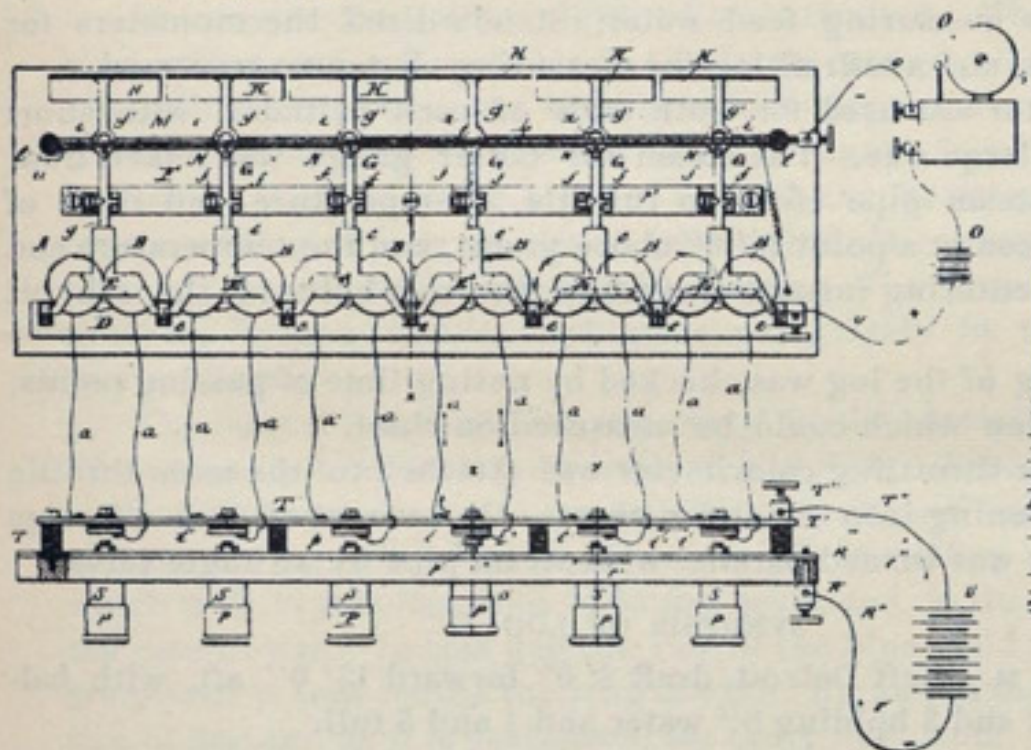
524,202. ELECTRIC SIGNAL FOR STEAMBOATS. Robert H. Gruschow, Chicago, Ill. Filed Jan. 30, 1894. Serial No. 498,533.

Claim. First, the combination with a series of magnets each included in circuit with a push button and a battery and each magnet provided with an armature, of a series of independent levers each carrying a visual signal at one end and having its other end arranged in the path of the armature of one of the magnets, a rock shaft common to the series of levers, and fingers carried by said rock shaft to sustain each lever in position when its signal is displayed, the rock shaft and its series of fingers being so organized and controlled with relation to the series of levers that an elevated lever and its signal will be lowered when another of the levers and signals of the series are elevated by the closing of its respective circuit. Second, in an electric signal, the combination of a series of levers each carrying a visual signal, a magnet for each of the levers, included in circuit with the battery and a circuit closer, and having its armature adapted to actuate the heel of the lever, an elevated bar L common to all of the levers and arranged in the path of the same, an alarm circuit including a local battery and an audible signal mechanism, and having its conductors in electrical connection with the bar L and the armatures of the electro-magnets.

524,239. SUBMARINE SIGNALING. Lucien I. Blake, Lawrence, Kans. Filed Dec. 22, 1893. Serial No. 494,424.

Claim. In a system of signaling between an anchored light ship and a shore station, the combination with telephonic signaling instruments at

524,202. ELECTRIC SIGNAL FOR STEAMBOATS.



the shore station, and telephonic signaling instruments on the ship, of an insulated cable extending from the instruments on shore to a point near the anchor, a conducting anchor chain, a transformer interposed between the cable and the chain and having its low resistance coil in circuit with the anchor chain and its high resistance coil in circuit with the cable, and a circuit leading from the anchor chain to a submerged plate over the ship's side and including the instruments on the ship.

524,243. RAISING SUNKEN VESSELS. Oscar A. Bulette, Charleston, Wash. Filed May 19, 1894. Serial No. 511,865.

Claim. A device comprising a float, a spool or drum journaled on the said float and carrying a rope or cable connected with a vessel, a sleeve adapted to engage one flange of the said spool or drum, pins projecting from the said sleeve, and a wheel screwing on a screw rod and engaging the said pins to press the said sleeve in frictional contact with the flange of the drum.

Speed and Cargo Records.—Lake Freight Boats.

Iron ore.—Maritana, Minnesota Steamship Company of Cleveland, 4,260 gross or 4,771 net tons, Escanaba to South Chicago; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 3,897 gross or 4,364 net tons, Escanaba to Ashtabula; S. S. Curry, Hawgood & Avery Transit Company of Cleveland, 3,852 gross or 4,314 net tons, Escanaba to Fairport; Kearsarge, Interlake Company of Cleveland, 3,718 gross or 4,164 net tons, Escanaba to Cleveland.

Grain.—Selwyn Eddy, Eddy Transportation Company of Bay City, 130,820 bushels of wheat, Detroit to Buffalo; Centurion, Hopkins Transportation Company of St. Clair, Mich., 147,812 bushels of corn, Chicago to Erie; Onoko, Minch estate of Cleveland, 187,657 bushels oats, Chicago to Buffalo.

Coal.—Selwyn Eddy, Eddy Bros. of Bay City, Mich., 4,270 net tons anthracite, Buffalo to Milwaukee.

Speed.—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 45 hours and 16 minutes, 16.4 miles an hour.

A British chart covering Lake Superior entire, including north shore, can be had from the MARINE REVIEW for \$1.

Cost of Living on the North West.

Dinning room charges on the Northern line passenger steamer North West have been the subject of considerable comment since the boat began service. The question as to whether they are reasonable or exorbitant is not within the scope of the REVIEW's best judgment, but as a matter of interest a copy of the dinner bill of fare of recent date is reproduced below. In cases where two prices are noted the first price is for half portion for one person, and in all cases where orders are sent to rooms an extra charge of 50 cents per person is made:

SOUPS—Consomme, 20-30 cents; tomato, 20-30 cents; pea, 20-30 cents; julienne, 20-30 cents; consomme de vaille princess, 20-30 cents; cream of asparagus, Augusta, 25-40 cents; crab farce, 50 cents; soft shell crabs 50 cents.

FISH—Boiled sea bass Antoinette, 30-55 cents; fresh mackerel, saute au fine herbs, 30-60 cents; broiled whitefish, puree of prawns, 30-55 cents; vol au vent of little neck clams, nantaise, 30-55 cents.

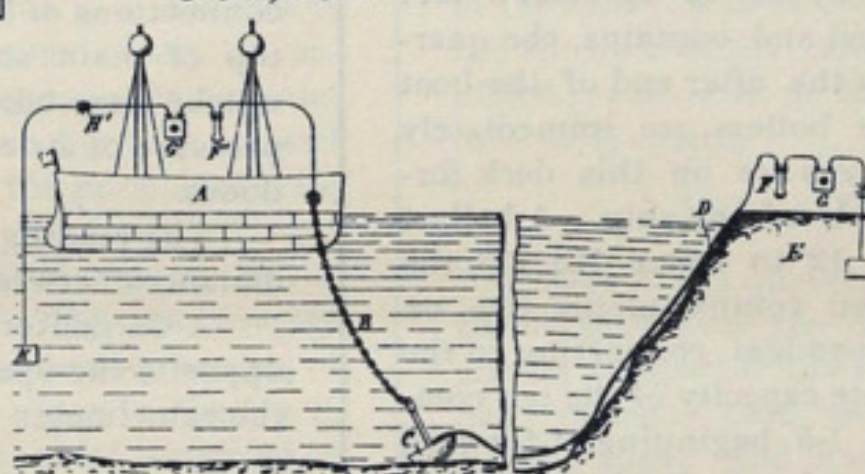
ENTREES—Spring chicken, larded, braise, sauce, celery, 60-\$1.10; calfs head, en tortue, 30-35 cents; filet Mignon, a la bearnaise, 40-75 cents; reed birds, en caisse, au truffes, 90 cents.

ROAST—Spring lamb, mint sauce, 40-65 cents; ribs of beef, 30-50 cents; spring chicken, half, 50 cents; spring chicken, whole, \$1.00.

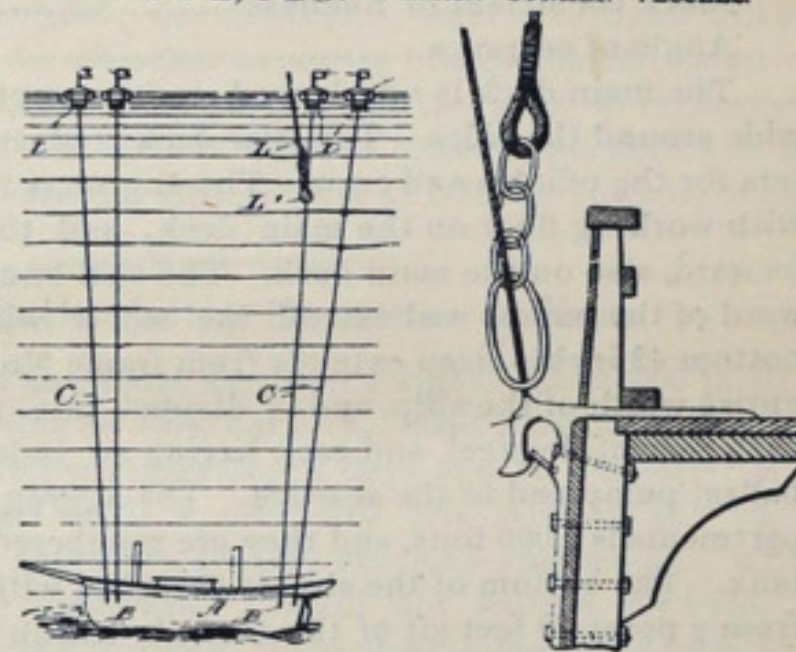
GAME—English snipe, 65 cents; plover, 60 cents; doe birds, 60 cents; squab, on toast, 75 cents.

VEGETABLES—String beans, 25 cents; peas, 25 cents; lima beans, 25 cents; beets, 25 cents; potatoes, boiled, 15 cents; cepes, a la bordelaise, 50 cents; fresh green peas, 30 cents; French string beans, 35 cents; succotash, 25 cents; asparagus, 35 cents; macedoine, 40 cents; corn, 20 cents;

524,239. SUBMARINE SIGNALING.



524,243. RAISING SUNKEN VESSELS.



French peas, 35 cents; mashed potatoes, browned, 25 cents; mashed potatoes, 20 cents; mashed turnips, 20 cents; boiled onions, 25 cents; potatoe croquette, 20 cents; boiled new potatoes, 25 cents.

SALADS—Cucumbers, 30 cents; vegetable, 30 cents; lettuce, 25 cents; cold slaw, 25 cents; radishes, 15 cents; celery, 30 cents; tomatoes, 30 cents; watercress, 25 cents; shrimp, 40 cents.

MAYONNAISE—Chicken, 50-75 cents; lettuce, 25-35 cents; salmon, 50-75 cents; celery, 25-40 cents; tomato, 45 cents; lobster, 40-60.

COLD DISHES—Ham, 25-40 cents; mutton, 25-40 cents; tongue, 25-40 cents; roast beef, 30-50 cents; lamb, 30-50 cents; pressed corn beef, 20-40.

RELISHES—Sardines, 30 cents; mixed pickles, 10 cents; gherkins, 10 cents; celery, 30 cents; chow chow, 15 cents; French olives, 20 cents; queen olives, 25 cents; cauliflower, 15 cents; white onions, 10 cents; pickles, 10 cents; chutney, 15 cents.

CHEESE—American, 10 cents; Roquefort, 25 cents; Neufchatel, 20 cents; Edam, 20 cents; Swiss, 25 cents; Camembert, 25 cents.

PASTRY AND DESSERT—Lemon cream pie, 15 cents; apricot pie, 15 cents; English plum pudding, hard and brandy sauce, 20 cents; meringue glace, 25 cents; macaroons, 15 cents; Swiss meringue, 25 cents; Charlotte russe, 20 cents; meringue a la creme, 20 cents; French kisses, 20 cents; cold custard pudding, 20 cents; wine jelly, 20 cents; Roman punch, 30 cents; vanilla ice cream, 25 cents; coffee ice cream, 25 cents; kirsch punch, 30 cents; Marsquino punch, 30 cents; strawberry ice cream, 25 cents; chocolate ice cream, 25 cents; marble cake, 20 cents; lady fingers, 15 cents; pound cake, 20 cents; fruit cake, 20 cents; assorted cakes, 20 cents. Preserves—Raspberries, 25 cents; Strawberries, 25 cents; plums, 25 cents; peaches, 25 cents; pears, 25 cents; apricots, 25 cents; cherries, 25 cents; bananas, 20 cents; raisins, 15 cents; raspberries, 25 cents; nuts, 15 cents; figs, 15 cents; coffee demi-tasse, 15 cents; pineapple, 25 cents; watermelon, 30 cents.

Prices of wine are about the same as are charged in first class restaurants and hotels, with beer at 15 to 25 cents per pint bottle, and ale 30 cents.

Passed Assistant Engineer McFarland and Naval Constructor Capps have been invited to lecture at the Naval War College this summer.

Steel Steamship Harvey H. Brown.

REPORT OF EXPERIMENTAL TRIP—MODERN COARSE FREIGHT STEAMER
BUILT BY DETROIT DRY DOCK COMPANY AND OWNED BY
NORTHWESTERN TRANSPORTATION COMPANY, DE-
TROIT, MICH.—AUGUST, 1894.

Test and report by Geo. C. Shepard, Cleveland, O.

The Harvey H. Brown, a steel steamer built for freight service upon the great lakes, was designed and built by the Detroit Dry Dock Company of Detroit, Mich., and engined by the Dry Dock Engine Works, both concerns being practically under one management. She was first put in commission in May, 1894, and has since been and was at the time of this test engaged in carrying iron ore from Lake Superior ports to Lake Erie ports, returning in water ballast, the round trip of about 1,800 miles occupying about a week.

DIMENSIONS—

Length, over all.....	359' 2"
Length, between perpendiculars.....	342' 0"
Beam, moulded.....	42' 1"
Depth.....	25' 0"
Draft, light.....	13' aft, 2' 0" forward
Displacement.....	2,485 net tons
Area immersed midship section.....	300.5 square feet
Area of wetted skin.....	17,335 square feet
Block coefficient of fineness.....	.828
Angle of entrance.....	49° 44'
Draft, loaded.....	14' 11" aft and 14' 10" forward
Displacement.....	5,365 net tons
Area immersed midship section.....	608.2 square feet
Area wetted skin.....	23,332 square feet
Block coefficient of fineness.....	.94
Angle of entrance.....	63° 44'

The main deck is not decked over except by a strip of steel 3 feet wide around the sides. The spar deck is of steel and contains the quarters for the officers and crew. The engine is in the after end of the boat with working floor on the main deck, and the boilers are immediately forward, also on the main deck. The coal bunkers are on this deck forward of the boilers and extend the whole width of the ship. A ballast bottom 42 inches deep extends from frame No. 12 to frame No. 133, the entire width of the ship, and is divided into ten compartments, five on each side of the keel, and each having an independent connection to the ballast pump and to the seacock. The aggregate capacity of the ten compartments is 1,000 tons, and they are numbered 1-5 beginning at forward tank. The bottom of the ship is sheathed with oak plank 8 inches thick, from a point 20 feet aft of the stem, to within 40 feet of the stern post, and coming up 30 inches above the height of the keel. The ends are faired off with a plate 8 feet long, the space between plate and skin being filled with cement. The main engines are of the triple, inverted vertical type with the H. P. cylinder between the M. P. aft and the L. P. forward; air pump, bilge and cooler pumps driven by beam attached to L. P. cross-head; crank shaft 12 inches diameter, continuous, on four journals with H. P. crank leading, M. P. next and L. P. last in the sequence. The H. P. valve is of piston type operated by Joy valve gear, while the M. P. and L. P. valves are double-ported slide valves worked by two eccentrics through Stephenson links. A jet condenser condenses exhaust from L. P. cylinder.

Dimensions:—H. P., 22" diameter; M. P., 35", L. P., 56" diameter, stroke, 44"; connecting rod, 11' 0"; ratio, 1-6. Air pump, 28" diameter, 18" stroke; trunk, 14" diameter.

Main boilers:—Two of cylindrical type placed side by side, fore and aft, sides covered. Diameter 13' 6", length 12' 2 1/8".

Furnaces:—Two to each boiler, 4' 0" inside diameter; one combustion chamber for each furnace.

Grates 5' 6" long; area, two boilers, 88 square feet.

Air opening in grates, two boilers, 24 8 square feet.

Number of tubes each boiler, 328; length 8' 3".

Diameter of tubes, 2 1/2 inches.

Heating surface, two boilers, 4,130 square feet.

Ratio grate to heating areas, 1:47.

Donkey boiler, vertical, 4' 0 1/2" diameter, 8' 8" high; grate surface 8.7 square feet; heating surface 243.2 square feet; ratio, 1-27.9.

Steam taken from top of boiler through a copper pan fastened over opening to stop valve. Feed pipe enters on side of boiler below center and is continued inside by copper pipe reaching toward the bottom. Total weight of machinery and water, with 12" coal on the grates is 291.6 net tons, and this, with a mean horse power of 1,250, makes machinery, etc., weigh 466 pounds per I. H. P. Air supply of furnaces is furnished through Howden system of hot draft, which consists of a fan 4' 6" diameter driven directly by a pair of horizontal engines 5" diameter and 5" stroke. From the fan, which is located in the engine room, a trunk leads through to the front of the boilers, where it enlarges into a large box in the boiler breechings, the lower side of the box being immediately above the upper row of boiler tubes. Passing vertically through this box are

412 3" tubes, 4' 6" long, and through which the gases must pass on their way to the uptake. The air is then taken down to the valves, admitting it above and below the grates. The fire doors and ash pit doors are air tight, and before opening the fire door for any purpose, the valves admitting air below the grates are closed. Retarders made of strips of iron 3/8" thick and 2 1/4" wide, twisted into a screw of four turns in the length of the tube, were put into all the boiler tubes before the return trip.

Propellor—Sectional, cast iron, four blades, 13' 2" diameter, 16' 0" pitch; 49.48 square feet projected area.

Auxiliaries:—Duplex feed pump 7 1/2" x 4 1/2" x 10", taking water from hot well of air pump or from feed-water heater which was made of 6" pipe 4' 0" long, and into the top of which the cold water from circulating pump and exhaust steam from auxiliaries entered, the heated feed water being taken from the bottom thereof.

Duplex service pump, 7 1/2" x 4 1/2" x 6".

Duplex ballast pump, 10" x 14" x 10".

Duplex circulating pump, 6" x 7 1/2" x 8".

Fan engine, double, 5" x 5".

Electric engine, double, single acting, 8" x 7".

The ship was also provided with steam steering gear, windlass engine, capstan engines and cargo hoists.

Propeller shaft 12" diameter, 30' 1 1/2" long,

Smoke stack, one, 5' 6" diameter, 40' high above the grates.

Apparatus used in connection with this test consisted of four indicators of well known manufacture, the springs for which had been accurately calibrated at the mechanical laboratory of the University of Michigan; a standard steam gauge, also calibrated at the same place, and by which the M. P. and L. P. receiver gauges on the engine were corrected; platform scales and spring balance for weighing coal and ashes; a 3-inch Union water meter for measuring feed water; standardized thermometers for measuring heat, and a taffrail log for measuring distances traversed.

One indicator was used for both ends of each cylinder, with short connections of large size. The steam for boiler gauge was taken from top of main steam pipe close to throttle. Temperature and draft of uptake were taken at a point 13' 0" above grates, and the temperature and pressure of air entering furnace was taken through holes in the ash pit doors.

The reading of the log was checked by noting time of passing points, distances between which could be measured on chart.

A Carpenter throttling calorimeter was attached to the main throttle opposite the opening into the steam chest. On account of lack of room the calorimeter was turned parallel with steam pipe by an angle valve.

SYNOPSIS OF LOG.

July 4, 4:30 P. M.—Left Detroit, draft 2' 0" forward 13' 0" aft, with ballast tanks 2 and 3 holding 8" water and 4 and 5 full.

8:55 P. M.—Passed Fort Gratiot light, log 0, 15-mile breeze ahead.

July 5, 5:17 A. M.—Put on first shovelfull of weighed coal, commencing test No. 1, with nuts in reverse arms of main engine, H. P. 6 1/2", M. P. 2 3/8" and L. P. 2 1/8" from point giving full stroke of respective valves. Auxiliaries running were the feed and circulating pump, service pump three hours, fan and steering engines. Took indicator cards 1-3 1/2 inclusive.

12:47 P. M.—Passed Detour light; log 184.1.

1:35 P. M.—Put on first fire unweighed coal ending test No. 1.

July 6, 12:31 A. M.—Passed Pt. Iroquois light, log 0.

11:00 A. M.—Started test with donkey boiler supplying steam for all auxiliaries. Stopped because said boiler would not supply enough steam.

4:10 P. M.—Commenced coal test No. 2 with nuts in reverse arms at H. P. 6 1/2", M. P. 4 1/2" and L. P. 3 3/8" from full gear. Auxiliaries—Feed and circulating pump, fan and steering engine and after 8:15 P. M. electric engine, 2.05 mean electric horse power. Took cards 6-10 1/2 inclusive; wind at 6 P. M., eight miles ahead; at 8 P. M., fifteen miles ahead.

July 7, 12:25 A. M.—Ended test No. 2.

2:31 A. M.—Passed Two Harbors' light, log 298.5. Loading 3,046 gross tons of ore, and cleaning tubes and putting retarders into them. Draft on leaving dock, 14' 7 1/2" forward, 15' 3" aft.

12:35 P. M.—Passed Two Harbors' light, log 0.

8:00 P. M.—Started coal test No. 3; engine in same condition as in test No. 1. Auxiliaries—Feed and circulating pumps, fan and steering engines and electric engine developing 2.65 electric horse power. Took indicator cards 11-14 inclusive.

July 8, 9:45 A. M.—Commenced coal test No. 4; gabs in reverse arms, H. P. 6 3/8", M. P. and L. P. at full stroke of valve. Auxiliaries—Feed pump, circulating pump, fan engine and steering engine. No wind. Took cards 15-15 1/2-17.

11:25 A. M.—Stopped coal test No. 4.

5:30 P. M.—Took cards No. 18, engine backed at half speed.

6:30 P. M.—Left lock at Sault Ste. Marie.

Passed Detour light, log 0.

July 9, 8:30 A. M.—Commenced coal test No. 5. Engine gabs in reverse arms $6\frac{1}{2}$ - $1\frac{1}{2}$ - $2\frac{1}{8}$. Auxiliaries—Feed pump, circulating pump, fan engine, steering engine and service pump 1 hour 40 minutes. Took cards 19-23 $\frac{1}{2}$ inclusive. No wind.

3:30 P. M.—Stopped coal test No. 5, but continued weighing coal till 8:30 P. M., weighing the ashes made during the twelve hours.

4:40 P. M.—Passed Fort Gratiot light; log 179 miles.

11:38 P. M.—Passed Bar point light, log 0.

July 10, 7:45 A. M.—Commenced coal test No. 6; engine gabs in reverse arms at $6\frac{1}{2}$ - $2\frac{3}{8}$ - $5''$. Auxiliaries—Feed pump, circulating pump, fan and steering engine. Took cards 26-28 inclusive.

12:25 P. M.—Passed Presquile light; log 132.35.

12:30 P. M.—Stopped coal test No. 6.

July 12, 6:47 P. M.—Passed Presque Isle light.

9:00 P. M.—Stopped fan and made effort to run with natural draft.

9:15 P. M.—Started fan again and took data with the fan making different number of revolutions per minute.

[TO BE CONTINUED.]

Some Interesting Facts About Flags.

The flag lockers of a modern cruiser contain more than 200 ensigns, and in this country they are made in the flag room of the equipment building at the Brooklyn navy yard. The flags of many nations are of most elaborate design, and composed of every color known to the flag maker's art; others are severely plain, but all have to be mathematically correct as to size, color, and proportion. Our own flag is a difficult one to make correctly with the forty-four stars in its blue field and have them accurately arranged. Each star must occupy its correct position, and not deviate a quarter of an inch, that the symmetry of the union be preserved.

In constructing flags eight colors are used. They are red, white, blue, yellow, green, brown, black, and lately canary yellow has been added. The yellow first mentioned is rather of an orange tone. The canary shade was adopted to take the place of white in signal flags, as at a distance it was found that the white blended in with the horizon and made the accurate reading of a signal almost impossible; in consequence the navy department has recently ordered the change. The brown bunting is used to typify bronze, and is used quite extensively in the more elaborate foreign flags.

The largest flag made for our navy is the American ensign No. 1. This has a fly of 36 feet and a hoist of 28.9 feet. It is a flag that is rarely made. The cruisers Brooklyn and Minneapolis will be the only vessels of our navy to carry it. The flag borne by all our other ships is the No. 2, which is 27.19 feet long and 14.35 feet wide, and is the chief standard of the man-of-war. In this flag the side of the blue field in which the stars are placed is four-tenths the length of the fly, and in the same manner the size of flag and field is designated for every flag from the No. 2 down to the No. 8 which is only $4\frac{1}{2}$ feet long and 2.67 feet wide.

In the Brooklyn yard flag room are made flags of forty-four different nations, two sizes for each. The No. 1 is 34.86 feet long and 13.12 feet wide. The No. 2 is smaller. The United States flag is given to our cruisers in seven sizes for use in various parts of the ship and in small boats and on various occasions. All the bunting used is of American make and comes from either the United States Bunting Company or the New England Bunting Company, both of Lowell. About 50,000 yards are used every year, and to guard against any possible defects in its manufacture each piece is put to a rigorous test. Severe tests are made for fast color. A generous clipping is steeped in fresh water for twenty-four hours, after which it is vigorously scrubbed with soap, and when thoroughly rinsed out is dried in direct sunlight for eighteen hours. Bunting that will withstand all this is considered fit to be put into Uncle Sam's flags.

The most difficult flags to make are those of San Salvador and Costa Rica. The first is very elaborate and requires all the colors, and the second is not less elaborate and takes every color but brown. The intricate designs are cut out by means of zinc patterns. The American ensign is a comparatively plain flag. By aid of copper patterns the stars are cut out with chisels from muslin folded thirty times. The chisels are of various sizes for various stars, and only ten cuts are required to cut every thirty stars.

The launch of the steel steamer I. W. Nicholas at the Cleveland Ship Building Company, Saturday, was distinguished by the presence of a venerable old lady, whose life has been closely associated with the advancement of lake commerce. Mrs. Minch, seventy-six years of age and widow of Philip Minch, who was the father of Peter Minch and grandfather of the managing owner of the Nicholas, witnessed the launch of a steel steamer that will carry a cargo five times as large as that of the largest lake craft at the time when her husband first became interested in a very modest way in lake floating property.

August 20, excursion to Niagara Falls \$3.00 round trip via the Nickel Plate road. Cleveland ticket offices 224 Bank street, 534 Pearl street. 16

Chicago's Great Drainage Canal.

An idea of the magnitude of the work connected with Chicago's great sanitary waterway, the Des Plaines canal, may be gained through extracts made from a paper recently prepared by one of the engineers connected with the work. The canal begins at Bridgeport, six miles from the double-headed lagoon called the Chicago river. From Bridgeport to Joliet, where the canal will end, is 33 miles. Of this distance 10 miles or more are in clay, 10 miles are in rock, hard pan, glacial deposit, conglomerate and clay, and 13 miles are in rock which is covered with a few feet of dirt. In going through clay the canal is 202 feet wide on the bottom and 290 feet wide on the water level. In the rock the canal is 160 feet wide with the sides almost perpendicular. At low water in the lake the canal will be 24.3 feet deep, and at the mean or average stage of water in the lake the canal will be 26 feet deep. In order to secure this depth of water the deepest cut in the rock is 36 feet, and in the clay 40 feet. It is estimated that the total excavation will be 12,000,000 cubic yards of rock, and 35,000,000 cubic yards of dirt and glacial deposit. When all this mass of material is placed in the spoil banks, as the dumping banks are called, it will expand to a certain extent and occupy the space of 60,000,000 cubic yards.

It has been estimated that this mass of rock and dirt would cover a square mile 60 feet deep; it would more than grade the longest railroad between Chicago and San Francisco; the rock alone would build four of the great pyramids, and all the material in the spoil banks would build 20 of them; the rock excavated would surface 8,000 miles of country road, $13\frac{1}{2}$ feet wide and a foot deep, and would ballast 12,000 miles of railroad tracks; the floor of the channel will accommodate a city of 15,500 inhabitants, living in 3,500 houses, each house with a lawn around it 80 by 100 feet.

The excavation, giving outside estimates, will cost \$18,000,000. The right of way has cost \$3,000,000; the structures, such as bridges, will cost \$2,000,000, and \$2,000,000 for all other expenses brings the estimated cost of the canal up to \$25,000,000. The progress of the work so far, however, has shown that the canal will cost at least \$1,500,000 less than was estimated. The work of excavation will require 10,000,000 pounds, or 5,000 tons of dynamite.

When Death Valley Becomes a Sea.

"One of the queerest and most surprising sights I ever saw in all my wanderings over the wilds of this country," said E. C. Traver, a well-known prospector and civil engineer, a few days ago, to a reporter of the San Francisco Call, "was a newly constructed brig lying on the floor of Death Valley. And it is there yet, so that anybody can see it. When I first saw it I was almost paralyzed. I could not believe my eyes, and thought I must have passed through some mental lapse and was not in Death Valley at all. But, after gazing at the strange object a few minutes, and then looking around me and seeing the wastes of burning sands and feeling the hot breath of the desert wind, I knew that everything about me was most realistically real.

"I was crossing the valley at the northern end, which is quite narrow, but about the lowest spot on the earth's surface. I am not exactly certain, but I think that where the vessel is it is about 200 feet below sea level. After the first surprise had worn off I began to figure out how the craft got there. It proved to be a perfect brig of about 400 tons, that had never been in water. Everything about it was of the best style of workmanship, and showed plainly that the builder has put forth his best efforts. The keel was laid flat on the sand and the starboard side placed up against a small reef of rocks. The port side was supported in the usual manner.

"Climbing onto the deck by a small rope ladder, I found everything ship-shape. The decks were as clean and white as a man-of-war's, and every rope was in place. It was plain that the brig had been built where she was, but by whom and for what? A good-natured looking man with gray hair and beard, who appeared on the scene later, explained the mystery. He said that his name was Frederick Evans, that he was a ship-builder by trade, and one of the California pioneers of '49. He had never made a big strike, but had always kept prospecting, and when the water rose in Salton lake, a few years ago, he was at work in the mountains around Death Valley. It was then that he got it into his head that the water would eventually reach that locality, and he was determined to have the first vessel to float in the new sea. Evans was not a poor man, but had enough money to hire a couple of men to help him lay the keel of the vessel, put in the masts, and do other heavy work. At first the work was pushed rapidly, but when the water commenced to recede Evans took things easy and did all the work himself, because he thought the water would not come again for a year. He has been disappointed every year since, but still thinks that Death Valley will become a sea, and he is ready for it."

Chautauqua Lake free August 20 in connection with a \$3.00 Niagara Falls excursion ticket via the Nickel Plate road. Cleveland ticket offices 224 Bank street, 534 Pearl street, and depots. 16

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,761 vessels, of 1,261,067.22 gross tons register in the lake trade. The lakes have more steam vessels of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of steam vessels of 1,000 to 2,500 tons on the lakes on June 30, 1893, was 318 and their aggregate gross tonnage 525,778.57; in all other parts of the country the number of this class of vessels was, on the same date, 211 and their gross tonnage 314,016.65. The classification of the entire lake fleet on June 30, 1893, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,731	828,702.29
Sailing vessels.....	1,205	317,789.37
Canal boats.....	743	76,843.57
Barges.....	82	37,731.99
Total.....	3,761	1,261,067.22

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
1889.....	225	107,080.30
1890.....	218	108,515.00
1891.....	204	111,856.45
1892.....	169	45,168.98
1893.....	175	99,271.24
Total.....	991	471,891.97

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

	St. Mary's Falls Canal.			Suez Canal		
	1893.	1892.	1891.	1893.	1892.	1891.
No. vessel passages	12,008	12,580	10,191	3,341	3,559	4,207
Ton'ge, net regist'd	9,849,754	10,647,203	8,400,685	7,659,068	7,712,028	8,698,777
Days of Navigation	219	223	225	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

SHREWD MANAGERS of vessel property on the lakes—especially the line boat managers and the principals of iron ore companies controlling large fleets of steel vessels—are giving attention more than ever this season to economy in operating expenses, and from the manner in which the fuel question has been dealt with of late it would seem that lump coal will soon be looked upon as a luxury. Just as provision bills have been cut down in some lines to an average of about 33 cents per man per day, representing in a single boat a saving of as much as \$600 per season from bills that prevailed two or three seasons ago, so also are other matters of economy demanding systematic regulation, and the owner who contracts for a ship in the future is liable to be more exacting in his demands upon builders than was the case when in prosperous times one ship was patterned largely after another and the time required in construction was apparently of most importance. In another part of this issue there is begun a report giving data prepared on a trip made by the new steel steamer Harvey H. Brown, running light to Lake Superior for ore. These tests are becoming more frequent and are of especial importance to builders and owners who are seeking a thoroughly systematic basis for conducting their business. Employes aboard vessels, and especially engineers, who recognize this progress and take advantage of it will profit by their forethought.

It is certainly strange that a journal like the Iron Age of New York, looked upon as the leading trade publication devoted to the iron industry in this country, should publish week after week, in the form of correspondence from Duluth, columns of matter regarding the Mesabi and other Lake Superior mining districts that is almost entirely incorrect, and which is distinctly of the boom order. A letter in the current issue of the New York journal, for instance, says that the American Steel Barge Company is 50,000 tons behind in its ore-carrying contracts and that the same is true of other leading vessel lines. There was of course a little delay in moving ore from Ashland, on account of the strike on the Gogebic range, but everybody connected with the shipping business on the lakes knows that the great amount of ore already brought down is crowding Lake Erie docks and that ore shippers are past troubling themselves regarding the care of shipments. The Iron Age is a high class trade journal but it has swallowed since the opening of the Mesabi, a great deal of rot of the kind sent out by correspondents who are paid by the column.

IN CARRYING large cargoes of coarse freight of all kinds the steamer Selwyn Eddy, owned by Eddy Bros. of Bay City, and built by the Detroit Dry Dock Company, is now considerably in advance of all other big freight steamers on the lakes. Her latest record-breaking cargo is one of 4,270 net tons of anthracite coal, carried last week from Buffalo to Milwaukee on a draft of 16 feet 8 inches forward and 16 feet 11 inches aft. In addition to her cargo, the Eddy carried on this trip 230 tons of fuel. Other large cargoes carried by this steamer indicate the capacity of the largest type of freight boats now building on the lakes. In iron ore her record is 3,897 gross or 4,364 net tons, Escanaba to Ashtabula, while the largest grain cargo, one of wheat from Chicago to Buffalo, weighed out 130,820 bushels. These records are exceeded only by the cargo of 4,260 gross or 4,771 net tons of ore, which the steamer Maritana carried from Escanaba to South Chicago, where there was no limit of draught.

IN one year, 1890, new vessels built on the lakes aggregated about 112,000 net registered tons. This record occasioned considerable comment, but how insignificant it appears in connection with the statement that on June 30, of this year the shipping under construction in Great Britain amounted to 718,000 tons, of which 90 per cent. was steam tonnage. It must be remembered, however, that Great Britain practically has no rival in the ocean carrying trade. In the United States, including the trade between our own lake ports and Canada, only 22.3 per cent. of the foreign trade is carried on by American vessels, while 72.6 per cent. of the foreign freight trade of Great Britain is carried on by vessels of that nation. Then, too, British shipping represents 51.6 per cent. of the total tonnage employed in the foreign trade of this country, and the same is true in a somewhat smaller degree of countries like Germany, France, Holland, Portugal and Italy.

THE statement in the REVIEW last week, that shipments of iron ore from Lake Superior ports to August 1 were about 1,000,000 tons greater than on the corresponding date in 1893, has, we find, been misunderstood in a few cases, and the impression has gone out that the entire movement of iron ore so far this year is 1,000,000 tons ahead of last year. Such is not the case. While the shipments from Lake Superior ports has been largely in excess of last year, the movement from Escanaba has been restricted, and as a result official figures furnished to the iron ore agents in Cleveland, but not given out for publication in detail, show that the entire movement of ore to August 4, is but a little more than 200,000 tons greater than on August 1, a year ago.

Two and a half million tons of soft coal were shipped by lake to all Lake Superior ports last season. On the first of the present month the shipments aggregated only 286,785 tons. A great variety of statements regarding this trade have appeared in print, but these are the only correct figures, as they are from the only reliable source of information, the St. Mary's Falls canal statistics. Shippers claim that fully 900,000 tons of soft coal will go forward to Lake Superior this month and that the requirements as compared with last year will be cut 40 per cent., but however this may be it is certain that the shortage in shipments indicated above will necessitate some tall hustling in the coal line for the balance of the season.

THE House of Representatives has passed the bill changing the punishment for casting away a vessel from death to life imprisonment, and the measure will probably pass the senate also without opposition. Insurance companies engaged in marine business have advocated this change, which seems entirely proper. In these times no jury could be found to inflict the death punishment even for a crime of this kind.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stock of wheat and corn in store at the principal points of accumulation on the lakes on August 11, 1894:

	Wheat, bu.	Corn, bu.
Chicago.....	20,325,000	1,445,000
Duluth.....	3,492,000	17,000
Milwaukee.....	861,000
Detroit.....	1,335,000	6,000
Toledo.....	2,923,000	45,000
Buffalo.....	1,573,000	129,000
Total.....	30,509,000	1,642,000

At the points named there is a net increase for the week of 1,765,000 bushels of wheat, and a net decrease of 18,000 bushels of corn.

On the Chesapeake and Ohio canal between Hancock and Williamsport a force of men is employed in mowing grass under water from the bottom and inside banks of the canal. An ordinary harvesting mower, with closed wheels to keep the grass from clogging them cuts a wide swath, sending to the surface tons of long floating grass. The cleats on the wheels are very long and sharp to give the machine a firm grasp on the miry bottom. The mower is attached to the rear of the scow drawn by a heavy team. It is raised and lowered by means of block and tackle.

A Few Notes on Canadian Canal History.

In his speech at the dominion day celebration in London, Sir Charles Tupper made allusion to the new Canadian canal at Sault Ste. Marie and the completion of the system which enables Canada to have unbroken water communication from the Atlantic ocean to the western shores of Lake Superior. This long chain of river ways, lake navigation and canals, was not realized without much engineering skill, enterprise and expenditure. The amount expended on the canals of the dominion down to June 30, 1893, formed a total of \$71,310,793.46, the total revenue received being \$9,850,578.56. The collection of this revenue, formerly in the hands of the inland revenue department, was by order-in-council of June 4, 1889, assumed by the department of railways and canals.

It is noteworthy that although in time, as in place, the Sault Ste. Marie canal, as now constructed, is the last link in the long chain, the attempt to establish communication between Lake Huron and Superior was made before the close of the last century, and, therefore, at a very early stage in the development of canalization in Canada. We gave an outline of the circumstances to which that attempt was due and of the consequences to which it led a couple of years ago, an interesting account of the undertaking having appeared in one of the reports of the Dominion Archivist. In his paper on "The Canals of Canada," presented to the Royal society in May, 1893, and published in the transactions of that learned body, Mr. T. C. Keefer, C. M. G., C. E., returns to the subject. One of the northwest fur trading companies of Montreal cut a roadway, he tells us, 45 feet wide across the portage on the Canadian side of the Sault, and opened a canal upwards of 300 feet in length, with a lock that raised the water 9 feet. This lock 38 feet long and $8\frac{3}{4}$ feet wide, was built like a flume, the posts of which, at the lower end, were high enough to permit boats to pass under their caps. A windlass raised the lower gates, but the upper ones were folding with sluices therein to fill the lock. Into this lock the boats were conducted by a planked flume 300 feet long and 6 feet high, and just the width of the lock itself. A round log cribbing extended the length of the canal, 12 feet wide, forming a towpath for the oxen that drew the boats up stream. As the lock dealt with only half the height (18 feet) of the fall, the surface inclination above was 3 feet in 1,000 feet. This canal was completed in 1798, but in July, 1814, the adjoining post was pillaged and burned and the lock, with the wooden banks of the canal, was, it is supposed, burned to the water's edge. Between the building of this primitive Sault canal and the construction of the work of the same name to which Sir Charles Tupper referred in his dominion day speech, more than ninety years have intervened. Those who are fond of reflective retrospects have ample scope in contemplating the changes that came over the face of Canada during that long interval. It was, singularly enough, the same series of events that caused the destruction of the old Sault Ste. Marie canal and gave the impulse to the canal movement in this province and Ontario. In 1815 the legislature of lower Canada voted a grant of money to build a Lachine canal, and in 1816 a joint committee of the two houses of the upper Canadian legislature was appointed to report on inland navigation. Although Adam Lymburner had advocated its construction in 1791 and, indeed, it had been thought of nearly a century earlier by Dollier de Casson (Catalonge taking up in 1717 the scheme of which his death had prevented the accomplishment) it was not until 1821 that commissioners were appointed, and in 1825 the work was completed. Meanwhile a company had been formed to build the Welland canal—the conception of which is associated with the name of Hon. W. H. Merritt—and in 1824 first ground was broken. In 1834 the St. Lawrence system was commenced. Meanwhile the Rideau had been started as a military work, so that, when the union regime began, the united provinces were well advanced on the path to the goal now in view. The British North America act enlarged the sphere of canal enterprise, both as to area and accommodation, and how the country's increasing needs were met both in the main and branch lines Mr. Keefer's paper brings out with clearness and accuracy.

It was contemplated from the first that the system should have its western terminus on Lake Superior. Even before the canal was begun on the Michigan side, surveys and estimates were ordered by the province of Canada. It was not, however, until 1889 that the first contracts were entered into. Owing to representations of persons concerned, a supplemental agreement was made in the summer of 1891, and further changes were ordered in April 1892. By this final contract it was determined that the length of the chamber should be 900 feet, the width 60 feet throughout, the depth 20 feet 3 inches on the sills at the lowest recorded stage of the water in the river below the lock. The canal passes through St. Mary's island, on the north side of the rapids of the River St. Mary. The length across the island will be 3,500 feet and with the approaches, the total length will be about 18,100 feet—Canadian Manufacturer.

A London exchange says that the bascules of the great Tower bridge have been raised 311 times in fifteen days of July, and during that time 375 vessels passed through. The average daily number of passengers who have passed over the bridge during the period noted was 80,000, while the vehicles numbered 6,500 per day of sixteen hours.

From a Builder of Very Fast Vessels.

M. J. A. Normand of Havre is one of the most successful torpedo boat builders in the world. At the meeting of the Institute of Naval Architects of Great Britain he contributed a paper that has attracted special attention, as the subject was the "Importance of Economy of Fuel in Very Fast Vessels, and the Advantages to be Derived from Heating the Feed Water." One of the London journals devoted to ship building says of Monsieur Normand:

"He has for many years devoted his skill and energy to perfecting torpedo boats, and the wonderful results he has obtained in speed, but more especially in the economical consumption of coal, has been a matter of surprise to the builders of such vessels, and Mr. Thornycroft, who was present at the meeting, did not fail to show his appreciation. The secret of his success is in heating the feed water, and to do this he has contrived a special valve by which steam is taken in compound engines at mid stroke from the low pressure cylinder, and in triple and quadruple engines direct from the low pressure casings, all the work previously given up in the engine being a direct gain. Monsieur Normand, by his method of heating the feed, has obtained great economy in fuel, so much so that at 25 knots the consumption is not more than 2 pounds per indicated horse power per hour, which is about two-thirds that of similar craft built in this country. M. Normand has also reduced the total weight of boilers and machinery to about 48 pounds per maximum indicated power, and in a vessel now building this will be still further reduced. The gist of the paper is that whereas some engineers dispense with steam jackets, feed heaters, etc., in order to lessen the weight of machinery, Monsieur Normand utilizes these contrivances to increase the temperature of the feed. He thus saves in fuel much more than the extra weight due to steam jackets, etc., can do with fewer boilers, has an all-round saving, and utilizes to the fullest extent the advantages which can be obtained by such contrivances. The paper is well worth a close study by marine engineer superintendents, and also by those responsible for the designs of machinery, as what is applicable to the torpedo boat machinery is equally applicable to men-of-war or merchant vessels. Economy can be carried too far sometimes, and in saving the expense of feed heaters and other such contrivances, the first cost of which is comparatively trifling, ship owners are simply throwing away the value of them possibly hundreds of times in course of a year."

Trade Notes.

The Worthington hydraulic works at Brooklyn, N.Y., will be enlarged. Contracts for the work have been placed with the Berlin Iron Bridge Company of East Berlin, Conn.

Messrs. Geo. Quintard, Chas. H. Allen and H. Loring, Jr., assignees of Harrison Loring, have notified the creditors of that concern that the ship yard and engine and boiler building plant will be sold at auction at City Point, South Boston, Saturday, August 18.

Any fireman or oiler wishing to secure first papers next spring and not having sufficient knowledge of mathematics and engineering problems will receive a pamphlet free by addressing the MARINE REVIEW. This pamphlet will explain the methods of the Correspondence School of Mechanics, which gives instruction by mail at very reasonable prices. It is well spoken of by a foreman of one of the lake ship yards who sought instruction on special technical subjects.

Leading manufacturing concerns are evidently giving attention to the necessity of availing themselves of modern methods for handling work by machinery in these times of depression and close competition. Manning, Maxwell & Moore of New York, sales agents for the Shaw three-motor electric traveling cranes, made at Muskegon, Mich., received orders recently from the following firms: Pittsburgh Tin Plate Works, a 12-ton crane; Henry R. Worthington, celebrated steam pump manufacturers, a 30-ton crane; Midvale Steel Company, Nicetown, Philadelphia, a 40-ton double trolley crane. The crane ordered by H. R. Worthington is to supplement a Morgan electric crane, and the order from the Midvale Steel Company is especially satisfactory in view of the fact that that firm now has in its works one 80-ton, two 40-ton and two 20-ton Shaw cranes.

NEW TRAIN ON THE NICKEL PLATE ROAD—Commencing Monday, August 13, one additional train in each direction will be run between Cleveland and Lorain, leaving Cleveland 9:10 a. m. and returning leave Lorain at 1:50 p. m. This will make five trains each way on week days and two on Sundays between Cleveland and Lorain. 25-133

LINWOOD PARK, VERMILLION—To better accommodate its patrons the Nickel Plate road announces an additional train to those heretofore scheduled to stop. During the present season and the period covered by the camp meeting now in progress at Linwood park, the Lorain accommodation trains leaving Cleveland at 9:10 a. m. and 5:10 p. m. will extend those trips from Lorain to Vermillion. This will also be good news for the many picnickers who delight in the summer attractions at Oak Point, where those trains will stop for passengers. 1-134

Around the Lakes.

Coal handlers at Duluth are again talking of a strike.

The hull of the burned steamer Roanoke lies in 202 fathoms of water fifty-five miles west of Eagle Harbor and seventeen from Ontonagon, the nearest shore.

It is expected that the Chicago Ship Building Company's dry dock will be completed about Oct. 15. Keels for the two barges for the Minnesota company will be laid in a few days.

Tug H. W. Johnson has been chartered by the Detroit Salvage and Wrecking company to engage in the search for the wreck of the steamer Dean Richmond, which foundered near Erie last fall.

Some activity is noted in sales of lumber at Bay City. A recent transaction between David Whitney, Jr. of Detroit and Gray, Jenks & Co. of Cleveland is said to involve 7,000,000 feet at a consideration something like \$100,000.

General Passenger Agent Rogers of the Cleveland & Buffalo Transit Company announces another Niagara Falls trip from Cleveland—a mid-week excursion—at \$3 both ways, with Toronto and return \$1 extra. Tickets are good going Sept. 4, and returning on or before Sept. 10.

Citizens of Lorain, the Ohio port of which the Johnson company formerly of Johnstown, is erecting one of the largest steel plants in this country, have decided to issue bonds to the amount of \$100,000 for harbor improvements that will permit of ore being unloaded from vessels within the steel company's yard.

In the matter of reducing taxation of vessel property in Cleveland, the chamber of commerce members, who took up the subject some time ago, have had a meeting with the board of tax equalization and have submitted to that body arguments that are expected to result in a more liberal policy toward vessels in the future.

One of the directors of the Cleveland and Buffalo Transit Company is authority for the statement that the company will not build a new boat this winter. They will tide over another season with the State of New York and State of Ohio and apply earnings to the payment of indebtedness incurred in the establishment of the line.

Cleveland's new hydrographic office, now being fitted up in the Arcade, one of the largest buildings in the city, will be the finest in the country, according to a statement of Commander Sigsbee, chief of the service, who says that in fitting out the new office the bureau will have the benefit of experience gained in establishing other offices.

The schooner yacht Liberty H. Ware of Cleveland and a small steam vessel hailing from Chicago, the Tacoma, were the only lake vessels to which official numbers were assigned last week by the bureau of navigation. The Ware is numbered 141,344 and her tonnage is 44.50 gross. The Tacoma's number is 145,673 and her tonnage 76.28 gross and 39.48 net.

Delay in receiving water tube boilers for the fast McElroy steamer Unique, which is to run between Detroit and Port Huron, has upset plans of the owners of the boat for the present season, and it is now said that the boat, instead of making two trips per day on the rivers will make but one and extend her run to Toledo. She will be in service a week or ten days hence.

It is more than probable that Port Arthur and Fort William, the principal Canadian ports on Lake Superior, will be taking advantage of the deep water afforded by the 20-foot channel ahead of United States ports on the lakes. Through the efforts of Thomas Marks and others engaged in shipping at Fort William a dredge furnished by the dominion government has begun the work of deepening the channel at that port to 20 feet.

Pictures of ships are always interesting and to many people they have a special charm. A young man in Pasadena, Cal., who secured from the REVIEW copies of four steel engravings of American naval vessels advertised for sale at a slight cost says upon receipt of the pictures: "I think they represent very neat work and I wish I could have pictures of all United States war ships to hang up in my room. It is certainly grand to have the navy in one's home to view and admire."

Quite a land boom has been started at Gladstone, Mich., as a result of the purchase of extensive tracts of timber property by the Cleveland-Cliffs Iron Company and the plans of that company for the erection of a furnace, saw mill and other industries. It is learned from the Cleveland officers of the iron company that the furnace will be adapted to making either charcoal or coke iron, but the run will, of course, be principally on the former. The saw mill and accompanying smaller manufacturing plants will be utilized in taking full advantage of several industries that are now closely allied to the lumber business.

The most convenient train for the west is the fast express via the Nickel Plate road, known as No. 5, leaving Cleveland 11:12 a. m., daily including Sunday, and stops at Bellevue, Fostoria and Ft. Wayne, arriving at Chicago at 9:35 p. m. Palace buffet sleeping cars attached. 20-131

Great Figures Regarding Power.

Some great figures as to power are contained in the official report of the trial of America's greatest cruiser, the Minneapolis. The mean speed of the ship for the two runs over the course, under forced draft, with average air pressure from 9 inch to 1 inch (nine-tenths to an inch), carefully calculated and corrected for tidal currents, was at the rate of 23 knots and 73 thousandths (23.073). The collective indicated horse power of the main engines during the trial run was 20,366.23; that of all the machinery in use was 20,812.28. The total weight of the machinery, including the water in the boilers and condensers, and spare parts on board, was 1,961.8 tons. The time taken to put the rudder from hard-a-port to nearly hard-a-starboard at a maximum speed of about 20 knots was 40 seconds, and 50 seconds to full hard-a-starboard. During the experiment the engines slowed quickly to 110 turns or less. The experiment was tried a number of times when the engines were making less than 100 turns, and the time from putting hard over to hard over varied from 78 seconds down to 20 seconds.

In General.

George Uhler of Philadelphia, national president of the Marine Engineers' Beneficial Association, is on his annual visit to the Pacific coast.

A wooden steam yacht 110 feet over all, 16 feet beam and 9 feet deep with triple expansion engines, and costing entire about \$25,000, will be built by the Detroit Boat Works for Edward Henkel of Detroit.

Yarrow & Co. of London, who built the torpedo boat destroyers Hornet and Havock for the British admiralty, have contracted with the Russian government to build boats of the same kind to steam 29 knots.

Consular certificates of health required of passenger steamers trading on the lakes and at other northern frontier points will be dispensed with shortly and regulations governing the matter will be entrusted to the treasury department. A law making this change has just passed congress.

There is probably no truth whatever in the statement that the president will veto the river and harbor bill, on account of the action of congress with reference to the tariff. The bill as regards the aggregate of appropriations is entirely within the figures laid down by those who are supposed to speak for the administration of congress.

The board of naval bureau chiefs have asked the construction bureau to examine plans of the Holland submarine boat and report on its feasibility. This boat received attention with two other sub-marine boats, one of which was built at Detroit for Geo. W. Baker, whose death was probably hastened by the adverse report last year. An appropriation of \$200,000 is available for examination and building of sub-marine craft. The attention of the chiefs is directed to a young man in Oshkosh, Wis., who has something new, even if not practical, in this line.

Johnson & Higgins, average adjusters and insurance brokers of New York, who have conducted a large part of the business of placing risks on steel vessels of the lakes, in London, evidently take considerable interest in reading the REVIEW. Following is an extract from a letter recently received from them:

"Will you kindly do us the favor to send us by early mail an extra copy of your issue of June 30 last containing valuable information about the new steamer North West, in which every one connected with steamship matters on the lakes must feel very great interest. The regular copy of your paper which has reached us, we are sending to some friends and we wish to have a copy of it on our files. Kindly give this matter your usual courteous attention."

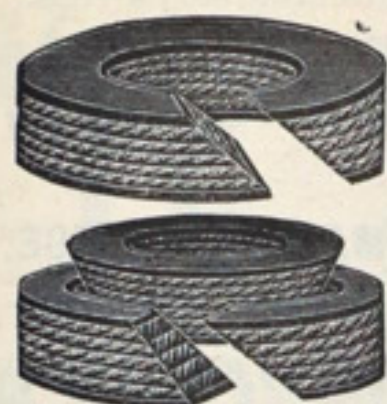
"SUMMER TOURS—The Nickel Plate road has placed on sale a complete line of tourist tickets to the resorts of the east, including Niagara Falls, One Thousand Islands, lower Canada, the Atlantic coast and the mountains of New York and New England. Address B. F. Horner, general passenger agent, Cleveland, O., for descriptive matter and full information. Aug 30

The Nickel Plate road runs its twelfth annual Niagara excursion August 20, at 10 p. m.; \$3.00 round trip. Cleveland ticket offices 224 Bank street, 524 Pearl street, and depots. 16

U. S. ENGINEER OFFICE, 34 West Congress street, Detroit, Mich., August 6, 1894. Sealed proposal for Operating Machinery for the 800-foot Lock, St. Mary's Falls Canal, will be received here until 2 p. m., September 5, 1894, and then publicly opened. All information furnished on application. O. M. POE, Col. Corps of Engineers.

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PITTSBURGH, 99 First Ave.
OMAHA, NEB., 322 Farnam St.
ST. LOUIS, 415 Morgan St.

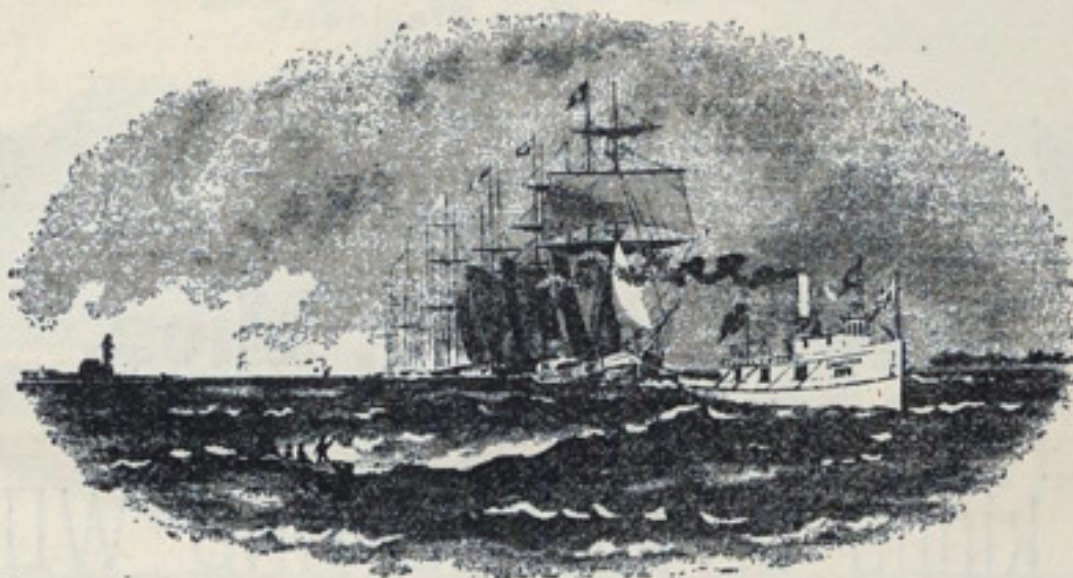
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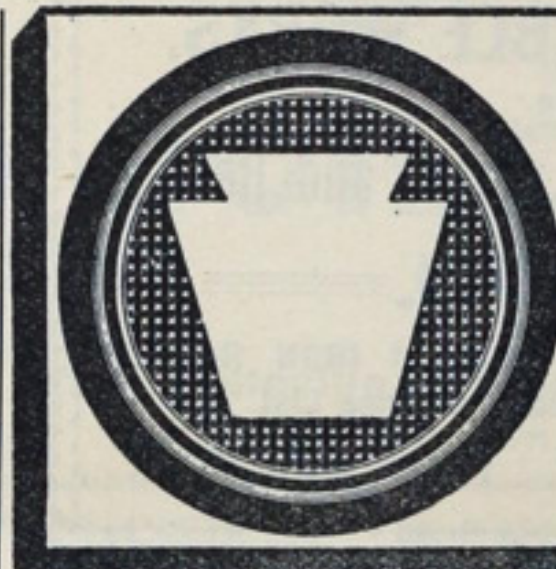
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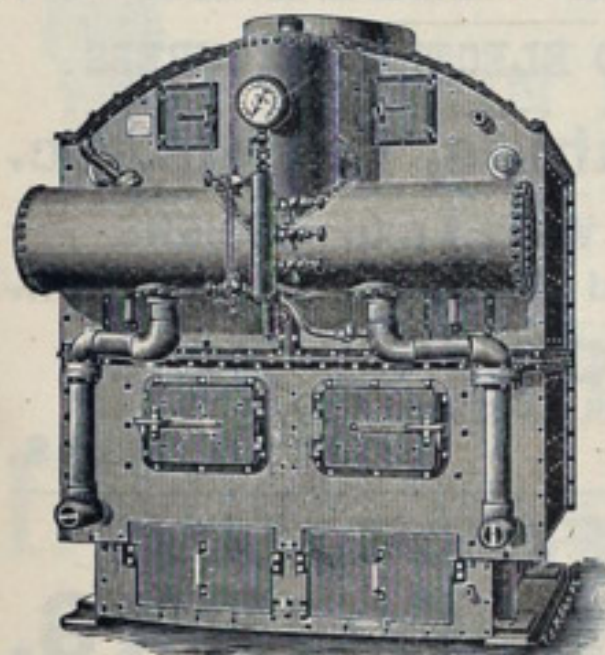
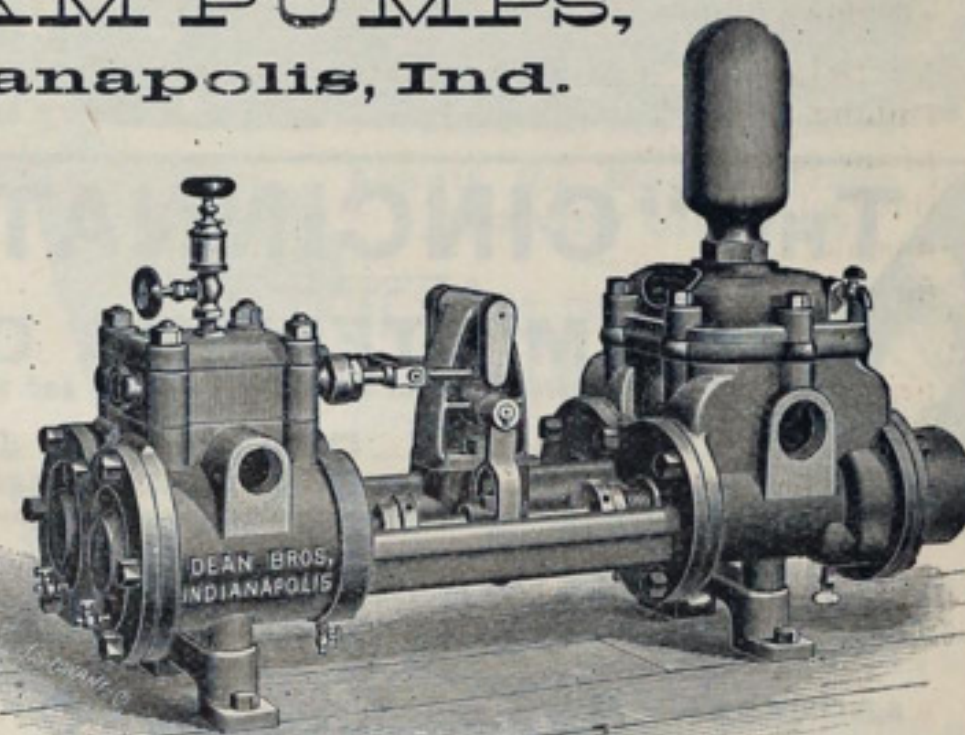
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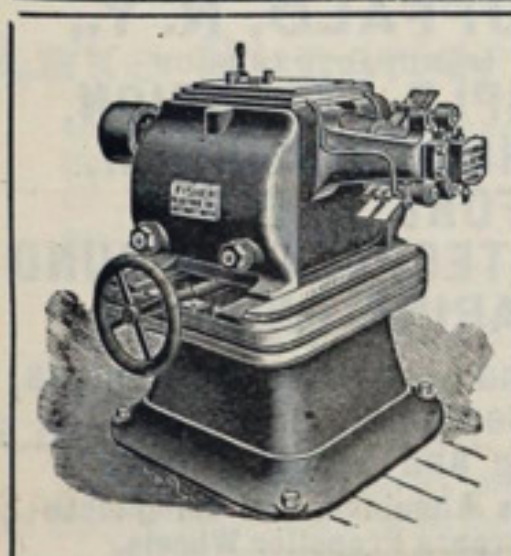


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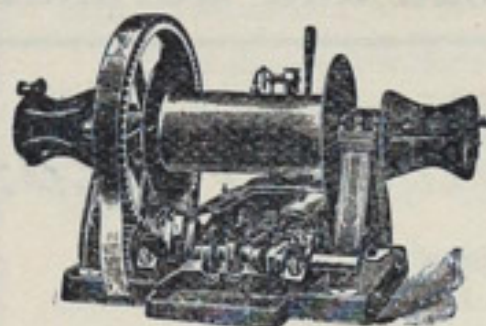
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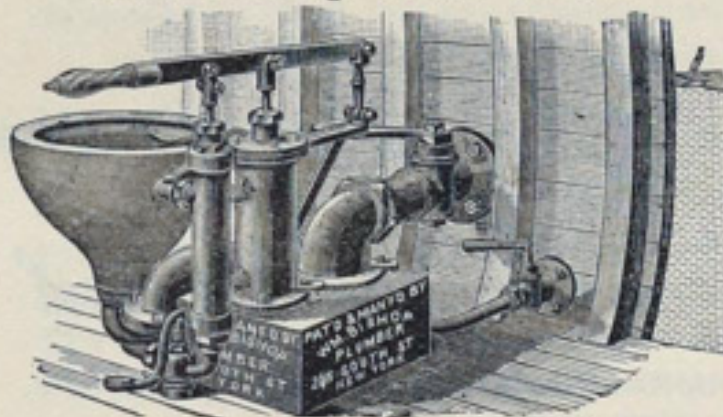
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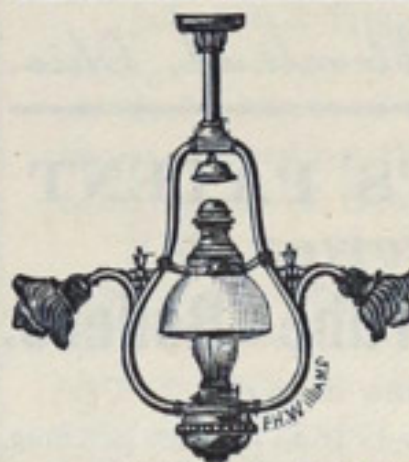
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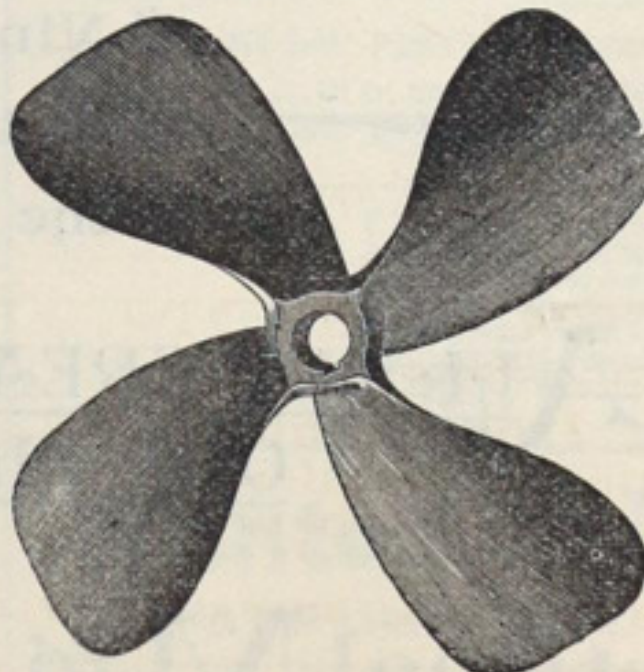
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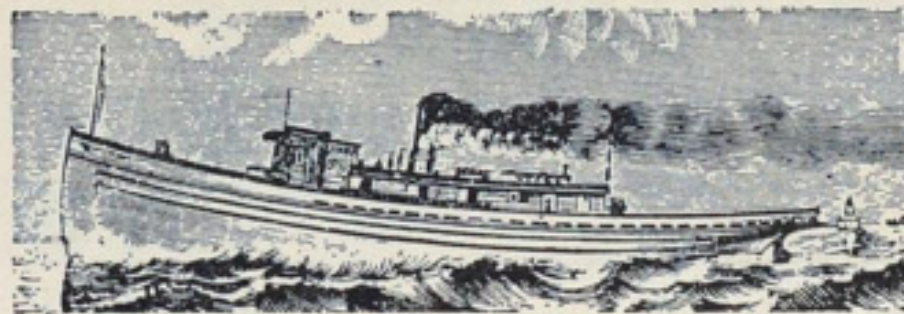
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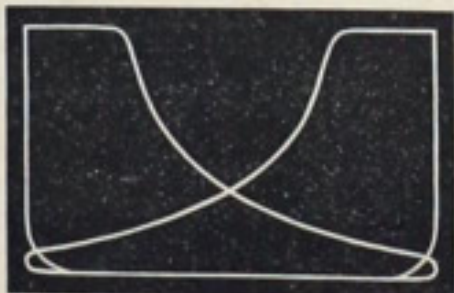
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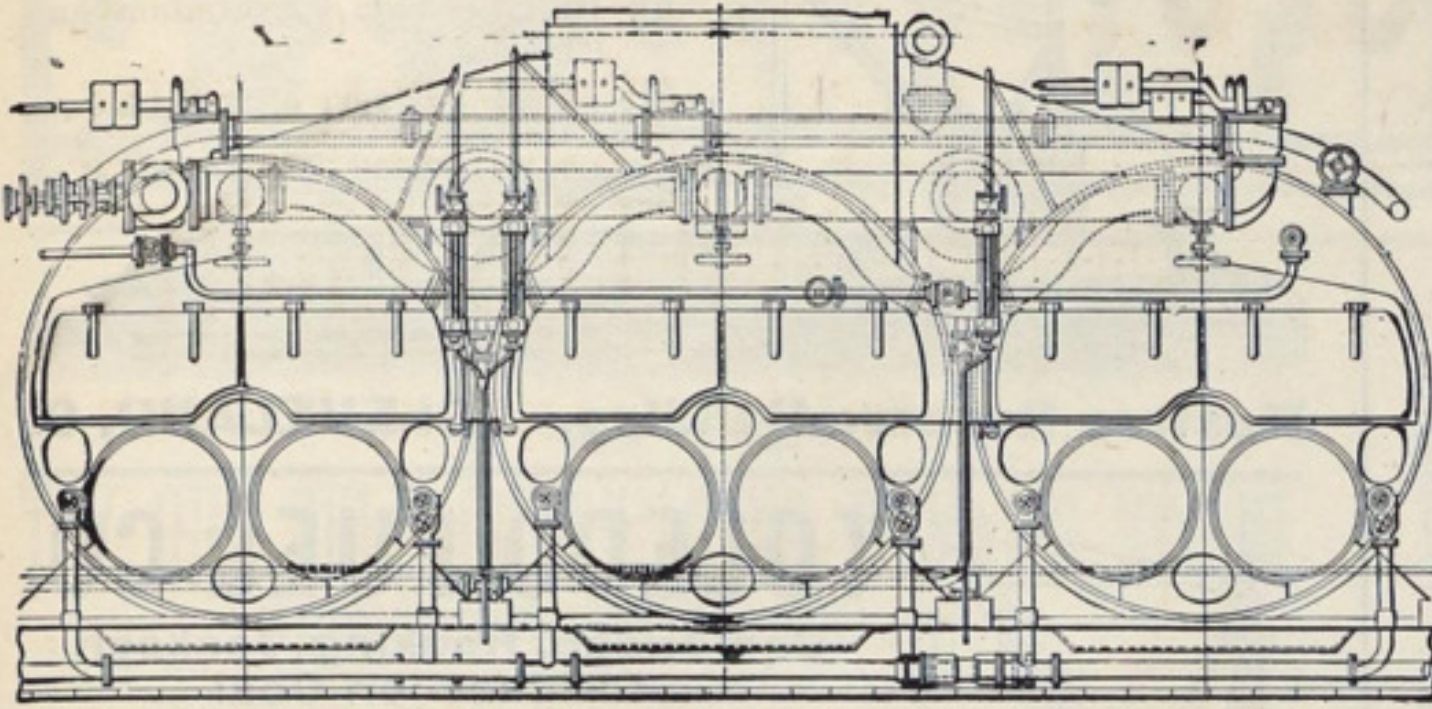
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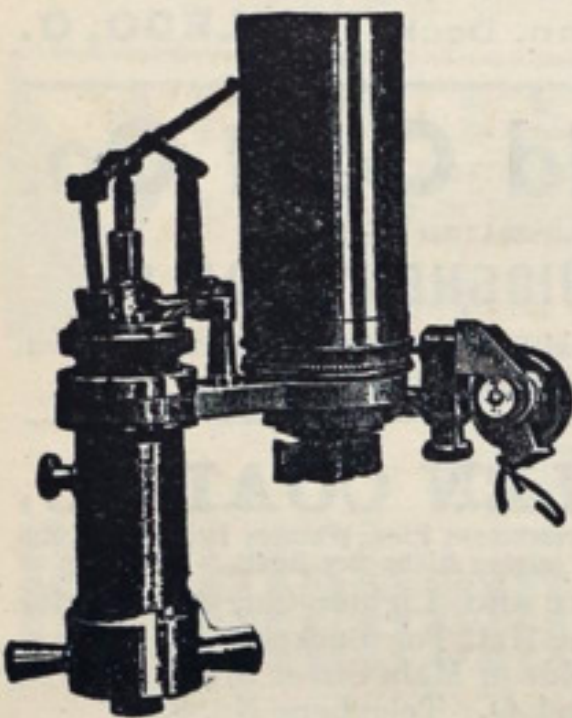
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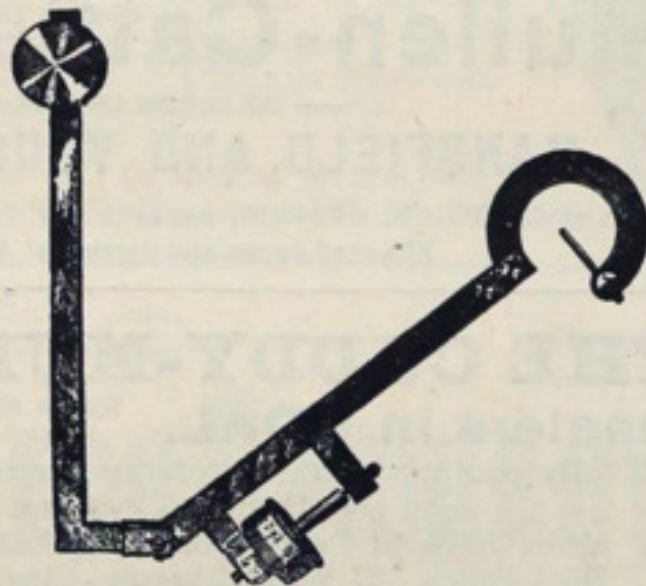
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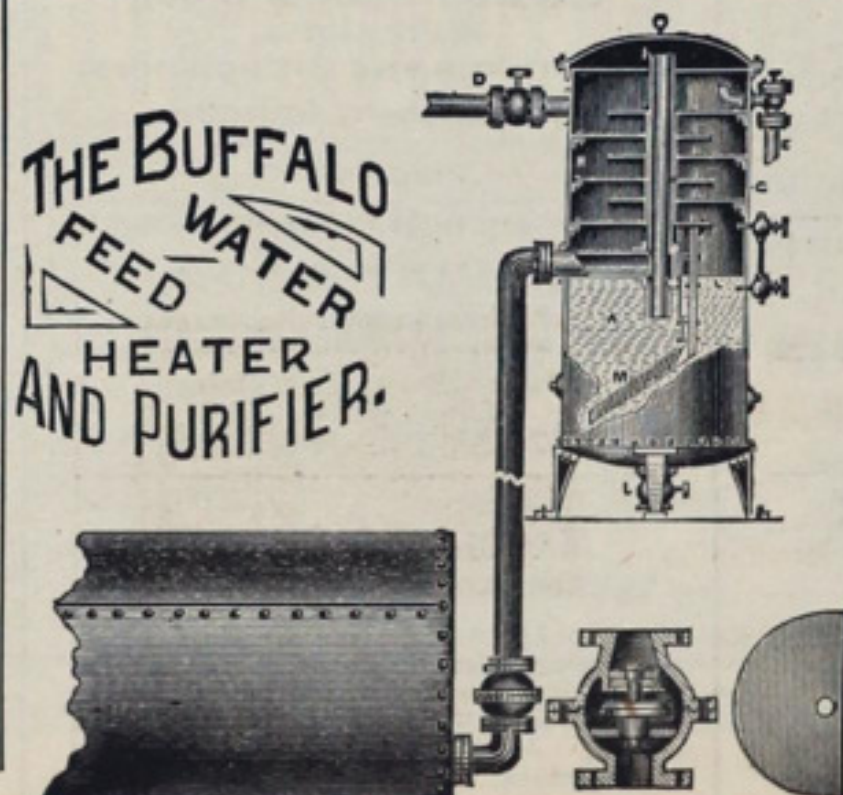
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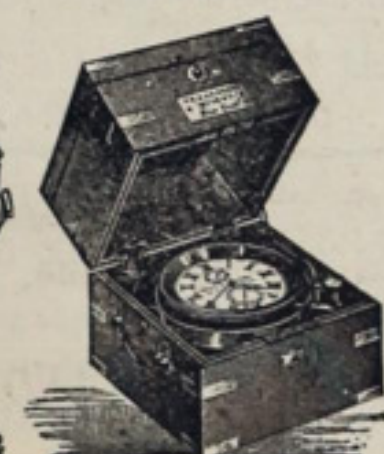
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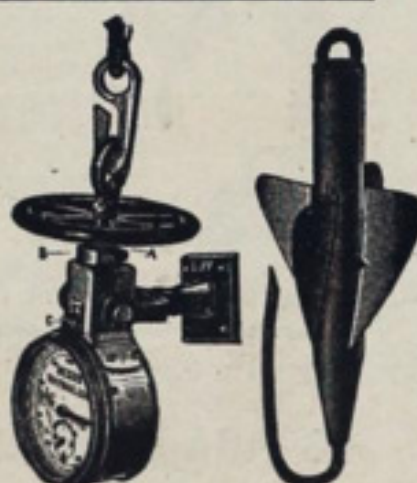
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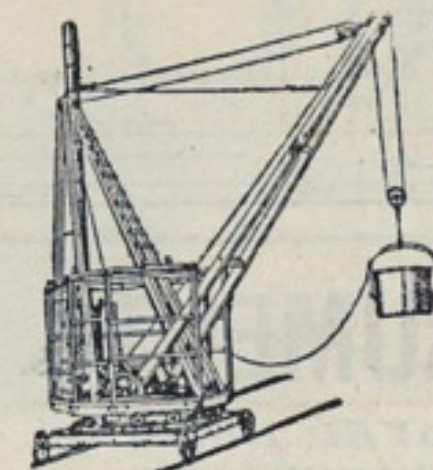
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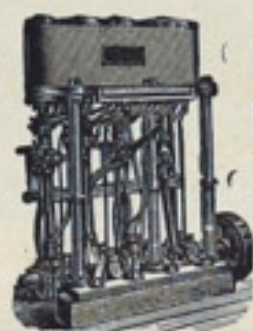
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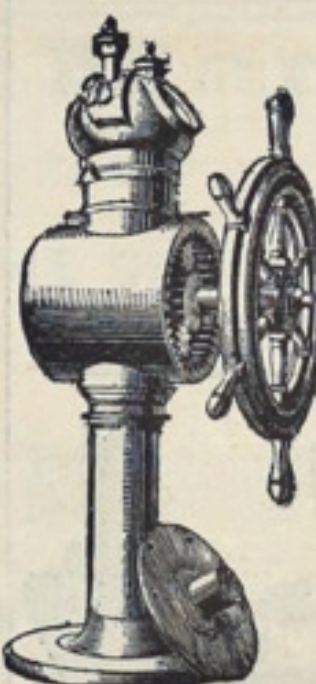
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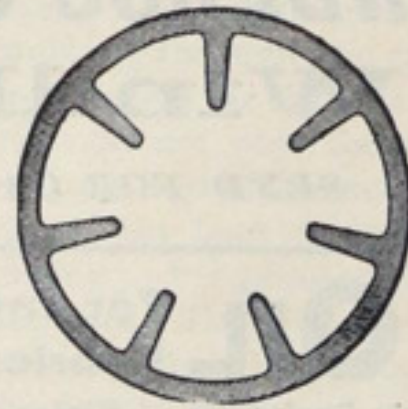
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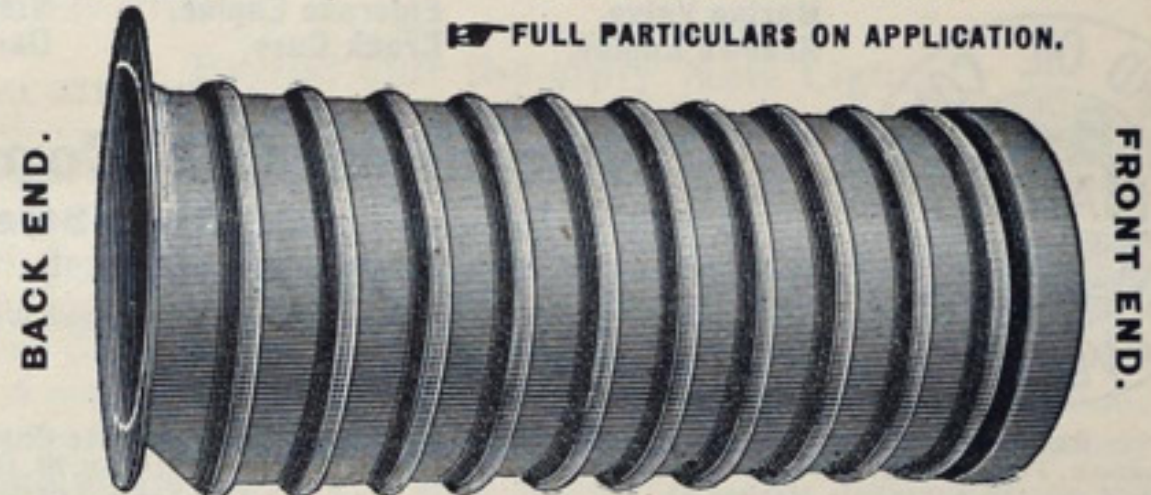
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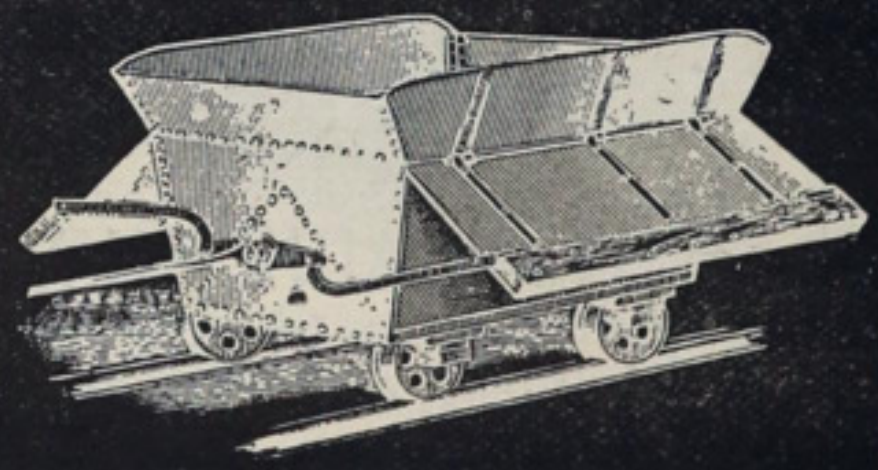
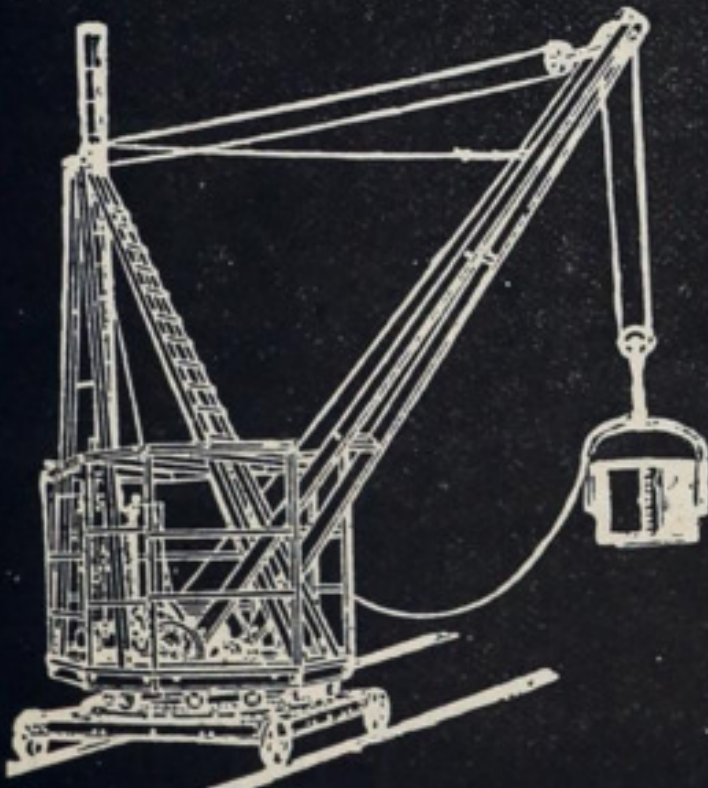
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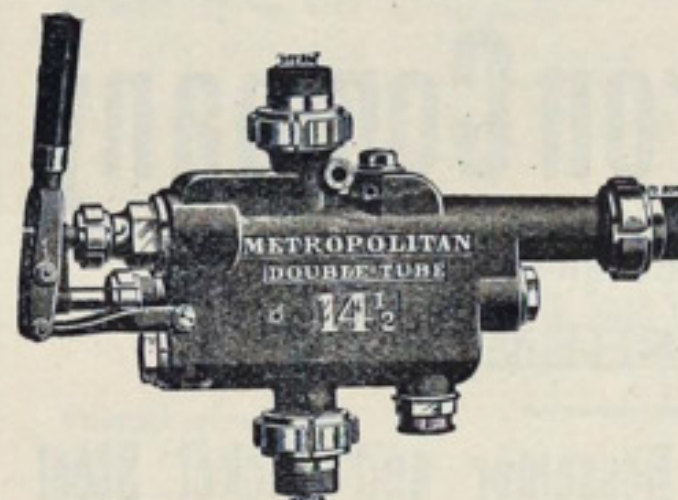
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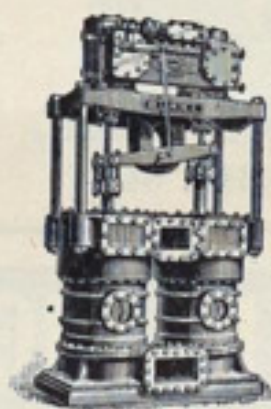
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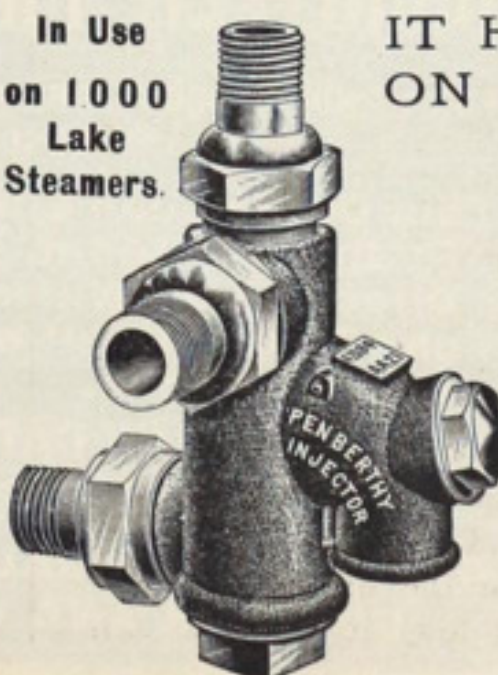
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